

SEMIZENTRAL

Water & Energy Sufficiency in Infrastructure Development

The SEMIZENTRAL Approach

Worldwide, urban growth involves an increasing consumption of basic resources, resulting in serious consequences for infrastructure, water supply as well as the treatment and disposal of wastewater and solid wastes.

In many fast growing cities local water resources are insufficient to supply the population with clean drinking water. Due to insufficient or non-existent treatment facilities for wastewater and waste, the quality of life as well as the environment is at risk. The SEMIZENTRAL approach is an infrastructure concept, which enables to meet these extensive challenges.

The innovative approach towards semicentralized supply and treatment systems has been developed to serve new-build residential areas in fast-growing metropolitan environments. Each urban district is provided with a flexible integrative infrastructure system for water, wastewater, and waste, adaptable to the respective need. In addition to the scale of the system, SEMIZENTRAL focuses on the integration of the infrastructure sectors water, wastewater, waste, and energy. This enables the interaction and coordination between the sectors and creates synergy effects: Intra-urban reuse of water for utilizations which do

not require drinking water quality offers a high potential to save valuable water resources and reduce wastewater discharge. It facilitates the reduction of drinking water consumption to the quantity needed for cooking, drinking, and personal hygiene, as the reused greywater – after adequate treatment – covers the demand of water needed for toilet flushing. By integration of waste treatment into the concept, it also fa-

cilitates the energy-autarkic operation of the supply and treatment center and contributes to greenhouse gas reduction.

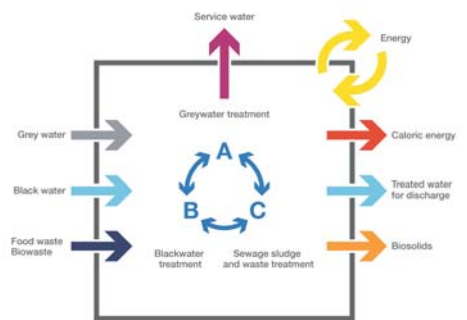


Figure: Functional Scheme of a semicentralized supply and treatment system

Water and Energy for Qingdao, P.R. China

Within the current research project the worldwide first semicentralized supply and treatment center (STC) is implemented in the course of the World Horticultural Exposition (WHE) 2014 in Qingdao: two residential areas and the WHE village as well as two hotel complexes for a total of about 12,000 inhabitants are established. The STC collects and treat the settlement area's wastewater according to the SEMIZENTRAL approach: Greywater and blackwater are collected and treated separately. The treated greywater is reused within the WHE village for toilet flushing, the treated blackwater amongst others for irrigation. Biogas and subsequently energy are generated in the STC by co-treating sewage sludge and food waste from nearby areas.



Picture: Front View of the semicentralized Supply and Treatment Center in Qingdao.

Investment as well as operating costs are paid for by the WHE development company. The German Federal Ministry of Education and Research (BMBF) finances the joint research group's scientific support during implementation (promotional reference 02WCL1266A-K). The objects of research are the validation, optimization, and further development of the SEMIZENTRAL approach. Inter alia, the energetic optimization

of the STC, validation of material flows, usability of output flows, planning and approval processes, transferability of the approach to other locations and environmental challenges will be researched.

The Opening of the Worldwide First STC

On June 28, 2011, in the presence of Premier Wen Jiabao and Federal Chancellor Angela Merkel, a joint declaration on the research and innovation program "Clean Water" was signed by the Chinese Ministry of Science and Technology (MoST) and the German Federal Ministry of Education and Research (BMBF). As part of this program an environment-friendly semicentralized supply and treatment center near

the premises of World Horticultural Exposition was build. After 6 months construction time, on April 27, 2014, this worldwide first reference plant was officially opened, with an extensive program and many high-ranking guests from China and Germany representing the fields of politics, industry, and science. The center is considered a milestone in sino-german knowledge transfer with global impact.



Picture: Prof. Peter Cornel (TU Darmstadt, Institute IWAR), Dr. Georg Schütte (State Secretary at the Federal Ministry of Education and Research (BMBF) and Peter Stamm (Wilo SE)

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